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An analysis of order utilization and overall costs secondary to an extended length of stay in hospitalized patients pending discharge to long term care facilities during the peak of Omicron

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Abstract

During the covid pandemic there was an influx of patients admitted to hospitals worldwide. This resulted in a presumptive overuse of resources, increased utilization costs, and decrease in hospital bed availability. This study focuses on patients admitted with a positive covid test, who required transfer to a long-term health facility after the acuity of their symptoms no longer required hospitalization but necessitated an extended length of stay due to acceptance into these facilities. Such facilities included: alternative living facility, skilled nursing facility, psychiatric institutions, or hospice. Wherein these facilities required a negative Covid PCR test or required a certain time frame to have elapsed after a positive test prior to accepting or recovering a patient. This study utilized patient records from Keralty Hospital, with admission during the 2022 peak of Omicron (January 31, 2022- February 13, 2022). Patient inclusion criteria was if they had a positive covid test on admission and experienced an extended length of stay over 2 days pending discharge to a long-term care facility. A quantitative/qualitative analysis was conducted of all orders placed subsequent to the first discharge order, and the number of additional days spent at the hospital. Correlations regarding total bed cost, and total overall, were then calculated using single tailed p values utilizing Prism 9 GraphPad software. Our research findings indicate there was a significant correlation between the number of extended hospitalization days and total bed costs but no correlation in the total overall costs or initial length of stay for each patient.

Keywords: Covid-19; Omicron; Length of stay; Hospital costs Assisted living

1. Introduction

During the covid pandemic there was an influx of patients admitted to hospitals nationwide. This resulted in overcrowding and a presumptive increased utilization of resources, along with a decrease in hospital bed availability. We wanted to look at the patients who had been diagnosed with covid who required transfer to other facilities such as: alternative living facility, skilled nursing facility, psychiatric institution, or hospice, after the acuity of their symptoms no longer required hospitalization. At times these patients were not accepted into these facilities until a certain time frame had passed, or until they were covid negative. This in turn added a presumptive overutilization of beds and resources.

This study aims to analyze which orders were over utilized in patients who were not accepted into these facilities after discharge, and how they correlated with their extended length of stay. It looked at records of patients admitted to Keralty Hospital before, during and after the peak of the Omicron wave in 2022. With the vast majority of patients

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admitted from January 31, 2022 through February 13, 2022. We hypothesize that a significant correlation exists between the number of extended days spent in the hospital and the total hospitalization costs.

2. Materials and Methods

This study examined admissions during the 2022 peak of Omicron (January 31, 2022- February 13, 2022). We used records of hospitalized patients at Keralty Hospital admitted on Jan 1,2022 through July 31,2022. The criteria for inclusion in the study was patients with a positive covid test on admission who experienced an extended length of stay over 2 days pending discharge to a long term care facility. A quantitative and qualitative analysis was performed on all orders placed subsequent to the first discharge order. The number of additional days spent at the hospital was also calculated. Total bed costs and total overall costs were obtained from the hospital billing department. Correlations were then calculated using single tailed p values utilizing Prism 9 GraphPad software.

3. Results

Quantitative analysis (Table 1) during this time frame reveals a correlation between extended length of stay was only found with the following orders: CBC, Glucose Meter, Gait Training, Neuromuscular Re-Education and Covid PCR tests. With the majority of orders being: CBC, BMP, Covid PCR, 15 Minutes of Therapeutic Activity, and Neuromuscular Re-Education (Graph 1). The data was notable for a significantly high number of orders for glucose meters, compared to other hospital orders (Graph 2). The total bed cost was variable, however total overall cost was the most expensive at day 4 of extended stay (Graph 3).

Table 1 Correlation between number of extended hospitalization days and orders, and descriptive analysis of data

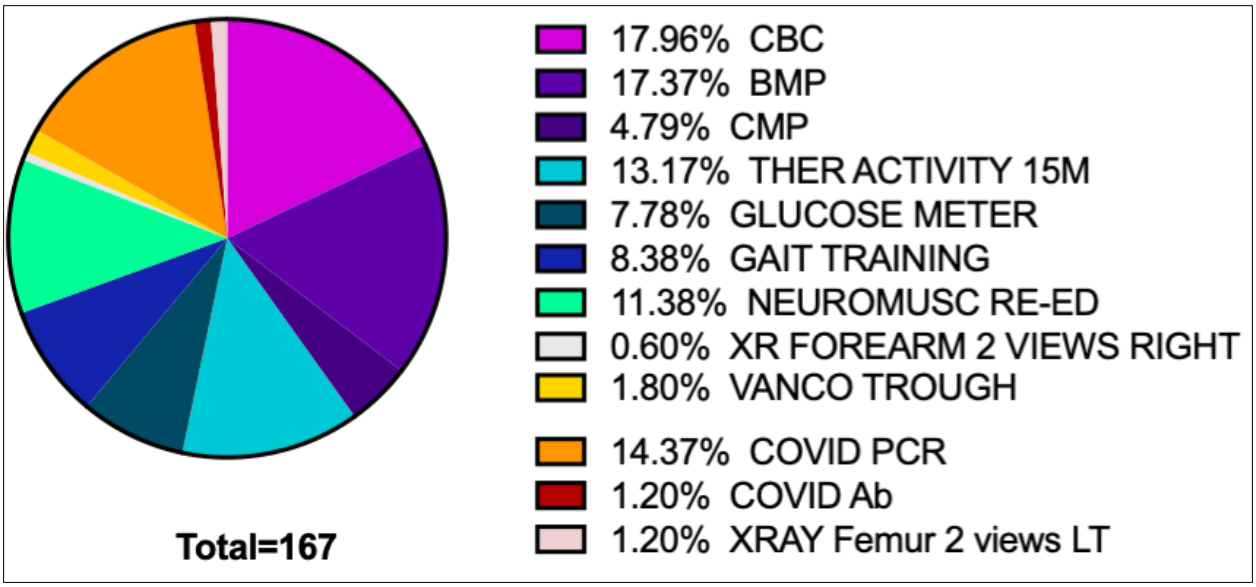
Correlation between: number of extended hospitalization days and cost factors											
	vs. Initial LOS	TOTAL BED COSTS	vs. TOTAL COSTS OVERALL	vs. CBC	vs. BMP	vs. CMP	vs. THER ACTIVITY 15M	vs. GLUCOSE METER	vs. GAIT TRAINING	vs. NEURO MUSC RE-ED	vs. COVID PCR
r	-0.146	0.565	0.275	0.351	0.227	0.459	0.609	0.663	0.808	0.557	0.371
95% confidence interval	-0.466 to 0.208	0.275 to 0.761	-0.0753 to 0.565	-0.0258 to 0.640	-0.160 to 0.553	-0.450 to 0.901	0.252 to 0.820	0.105 to 0.904	0.485 to 0.937	0.138 to 0.807	-0.0602 to 0.685
R squared	0.0213	0.319	0.0757	0.123	0.0514	0.21	0.371	0.44	0.652	0.311	0.137
P (two-tailed)	0.4182	0.0006	0.1212	0.0673	0.2458	0.3006	0.0026	0.0261	0.0005	0.0132	0.0893
P value summary	ns	***	ns	ns	ns	ns	**	*	***	*	ns
Significant? (alpha = 0.05)	No	Yes	No	No	No	No	Yes	Yes	Yes	Yes	No
Number of XY Pairs	33	33	33	28	28	7	22	11	14	19	22

Descriptive Analysis of Data							
	Number of values	**Minimum**	**Maximum**	**Range**	**Mean**	**Std. Deviation**	**Std. Error of Mean**
Initial LOS	33	2	19	17	5.6	3.3	0.58
Total LOS	33	4	22	18	10	4	0.69

# OF DAYS AFTER FIRST DC ORDER	33	2	16	14	4.4	2.7	0.48
TOTAL BED COSTS	33	2500	13750	11250	6231	2493	434
TOTAL COSTS OVERALL	33	11030	95594	84564	31567	19898	3464
CBC	28	1	6	5	2.8	1.9	0.35
BMP	28	1	6	5	2.4	1.6	0.3
CMP	7	1	4	3	1.7	1.1	0.42
THER ACTIVITY 15M	22	1	6	5	2.7	1.3	0.28
GLUCOSE METER	11	1	30	29	12	10	3.1
GAIT TRAINING	14	1	4	3	2.3	1.2	0.32
NEUROMUSC RE-ED	19	1	4	3	2.3	0.93	0.21
XRAYS	3	1	1	0	1	0	0
VANCO TROUGH	3	1	2	1	1.3	0.58	0.33
COVID PCR	22	1	4	3	1.5	0.8	0.17

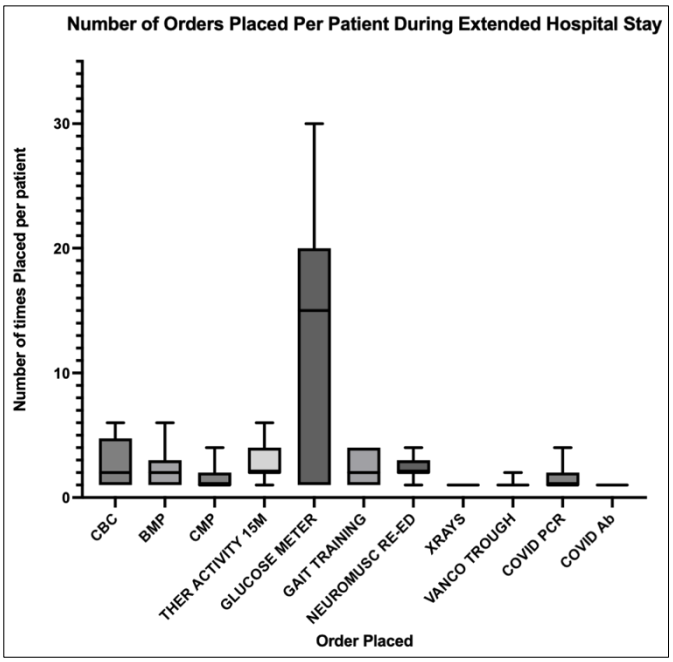
Abbreviations: LOS-length of service, Ther- Therapeutic, RE-Ed-Reeducation, DC-Discharge. The table compares the number of extended hospitalization days with various hospital orders submitted after the patient was initially discharged. Boxes highlighted in blue or contain an asterisk are statistically significant.

Graph 1: Percent of all orders placed during the extended stay period for patients pending discharge placement.



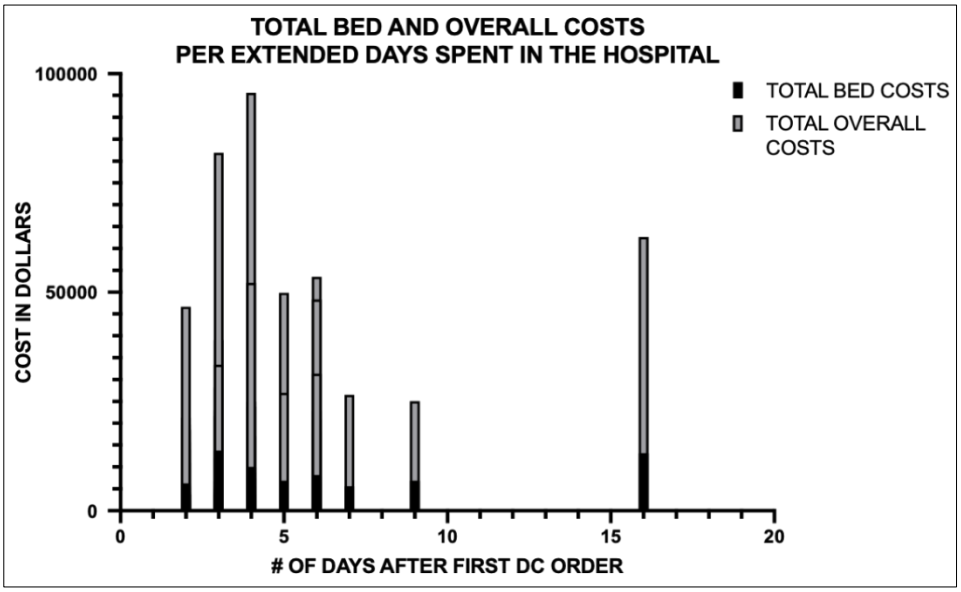
Graph 1 Pie graph depicts the percentage for each order placed during the extended stay period.

Graph 2: Orders placed per patient during extended hospital stay.



Graph 2 Bar graph depicting the orders placed on the x-axis, and the number of times the order was placed per patient average on the y-axis.

Graph 3: Total bed and overall costs per extended days spent in hospital.



Graph 3 Bar graph which depicts the total bed cost as black, and total overall cost as grey. The x-axis is the number of days after first DC(discharge) order. The y-axis is cost in USD.

4. Discussion

Hospital utilization strains resources, affecting patient care and necessitating effective management strategies. Increased hospital admissions, especially during the wave of omicron, challenged resource availability. This lead to tough decisions on prioritization and equitable care distribution. Surge in hospital utilization can delay care for non-emergent patients, requiring innovative care delivery models to meet all patients' needs. Rising hospital utilization

amplifies the need for increased needs for the care team as well. The need for Personal Protective Equipment (PPE), emphasizing the importance of robust protocols for procurement and conservation[1].

In order to aid hospitals in terms of budgeting for future crisis. Work needs to done on overcrowded emergency departments, limited ICU capacity, and effective protocols for ALFs and holding areas which are essential to optimize resource utilization. Cessation of insurance coverage can hinder patient access to care, necessitating proactive support from healthcare providers to ensure continuity of treatment. The cost of isolating elders many of which have been on mandated lockdown for months can take an emotional toll on their well being[2].

The hidden cost of extended stay patients was burnout among health care providers. As health care workers, stress and anxiety are common in unpredictable situations such as the pandemic. These symptoms can occur in the general population but are more likely to occur in health care personnel[3]. In the COVID-19 pandemic, more HCWs are facing life-threatening situations, pathogen exposure, and shift overload and other major changes in work organization [4]. Moreover, increased supervision and regulation reduced autonomy of HCWs and their time with patients. targeting the expansion of space, staff, and supplies may serve to maximize the quality of care during resurgences and future disasters.

5. Conclusion

Researching the relationship between extended hospitalization days and orders placed during the omicron peak it becomes evident that we should consider a specialized boarding area or protocol in place to meet the needs of patients who no longer require hospitalization or meet the requirements of acceptance into a long-term care facility in the event of a future pandemic or similar event. Hospital utilization poses unique challenges that necessitate strategic resource allocation, innovative care delivery approaches, and proactive support for patients amidst insurance disruptions to ensure quality patient care delivery and patient safety.

Compliance with ethical standards

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Disclosure of conflict of interest

No conflict of interest to be disclosed.

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